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TITLE: Development of the Moffitt Cancer Network as a  
Telemedicine and Teleconferencing Educational Tool for  
Health Care Providers

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<b>13. ABSTRACT (Maximum 200 Words)</b>  The Moffitt Cancer Network's (MCN) goal is to provide up-to-date oncology related information, resources, and education to oncology health care providers and researchers for the prevention and cure of cancer. The MCN provides access to educational programming, cancer control and clinical protocols, and a mechanism to exchange patient focused information leading to the improved detection and treatment of cancer. The MCN is health care provider focused and complements an array of existing public/lay information sources available elsewhere. It is built around the concept that oncology expertise is geographically centralized, multidisciplinary in nature and of limited availability. The MCN addresses these constraints by increasing availability through a World Wide Web-based design that enables wide access from many geographic locales. The Moffitt Cancer Network is available to users and can be found at: <a href="http://network.moffitt.usf.edu">http://network.moffitt.usf.edu</a> . The MCN currently has 212 presentations in its library, increasing at a rate of 4.8 presentations per month on average. Additionally, 12 conferences sponsored by USF and Moffitt are also currently available online.				
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## **INTRODUCTION:**

The Moffitt Cancer Network's (MCN) goal is to provide up-to-date oncology related information, resources, and education to oncology health care providers and researchers for the prevention and cure of cancer. Consistent with the aims of the Advanced Cancer Detection Center, the MCN provides access to educational programming, cancer control and clinical protocols, and a mechanism to exchange patient focused information leading to the improved detection and treatment of cancer. The MCN is health care provider focused and complements an array of existing public/lay information sources available elsewhere. It is built around the concept that oncology expertise is geographically centralized, multidisciplinary in nature and of limited availability. The MCN addresses these constraints by increasing availability through a World Wide Web-based design that enables wide access from many geographic locales. The objectives of this project are to:

- Collect and organize cancer information to provide educational content to physicians and other health care providers,

- Develop and implement software to encode video and audio to enable viewing over the Internet at a range of speeds (bandwidths),

- Implement a mechanism to deliver continuing education credits through on-line testing and automated submission/evaluation,

- Design and create a web page to permit easy sorting, searching and selection of educational programming,

- Design and create a web page to deliver physician referral information that includes submission of an electronic case record consisting of text and imaging data, and

- Provide access to case conferencing from remote locations using easily available audio/video to the desktop.

## **BODY:**

### **Task 1. Collect and organize cancer information to provide educational content to physicians and other health care providers. (Months 1-60).**

A schedule of events is determined in coordination with the Moffitt Office of Conference Planning, the USF Department of Education, the USF department of Continuing Medical Education and independent researchers wishing to present. These events include: Grand Rounds, the monthly meeting of the Cancer Control Research Interest Group (CCRIG), a number of national and local oncology conferences, as well as, more recently added, a number of JCAHO requirements for in-service education for nurses, physicians, and other hospital staff.

The MCN currently 212 presentations in its library, increasing at a rate of 4.8 presentations per month on average (over double the rate of the previous year). Additionally, 12 conferences sponsored by USF and Moffitt are also currently available online.

*Schedule videographer coverage of grand rounds and research conferences.*

The Network Coordinator in cooperation with Moffitt Department of Education compiles a

schedule of events. This schedule is used to determine the scheduling needs of the MCN videographer. The MCN videographer provides audio and video capture of these events on to 90 minute DVCAM (Digital Video Camera) tapes, which are then digitized by the MCN. The MCN plans to move to a fully digital, tapeless acquisition system for local presentations within the next year.

*Coordinate notification of nursing, pharmacy and other health care providers continuing education presentations.*

The Moffitt Department of Education notifies the MCN of all continuing education presentations and obtains a release from all speakers that permits the distribution of their respective presentation by the MCN.

*Organize the videotaping of faculty scientific presentations for national oncology conferences.*

The notification and videotaping of national oncology conferences is scheduled in accordance with the system mentioned above, developed in coordination with the MCN and the Moffitt education department. A number of conferences have been added to the MCN library. These presentations are digitized and are made available on the MCN website. The presentations acquired by this activity are codified by continuing education, searchable by subject and grouped by their respective conference title.

*Coordinate with the Department of Education notification and scheduling of relevant conferences.*

The Moffitt Department of Education notifies the MCN of all relevant conferences and the MCN videographer is scheduled in accordance with the videotaping needs of each conference.

**Task 2. Develop and implement software to encode video and audio to enable viewing over the Internet in a range of speeds (bandwidths). (months 1-60)**

*Explore the application of the Tag development software to support multiple video connections and the impact on network bandwidth.*

The MCN has developed a process of digitizing presentations using the Digital Renaissance Tag Composer. Through this process MCN is able to stream presenter's slides and audio simultaneously by using a Synchronized Multimedia Integration Language (SMIL) script file. MCN originally encoded presentation for distribution over ISDN speeds of 128k and modem speeds of 56k. The encoding process used previously created two-network streaming formats, one for ISDN speed connections at 128 kilobytes per second and a second format for current modem technology speeds of 56 kilobytes per second or less. Using the Real media server software, users linking to a presentation acquire the format (streaming speed) appropriate for their connection bandwidth. The server and the user's player handle this process automatically. Late in August 2000 MCN determined that the ISDN format was redundant, as it did not offer any significant improvement over the modem format due to the low frame rate of the presentations being developed (sometimes as low as one frame for every three minutes), and

MCN has discontinued the encoding an ISDN bit rate media file and thus lowering the production time.

In July of 2000 MCN began to explore the use of the Microsoft Media suite of tools for development of online course content. Microsoft Media provides significant advantages in bandwidth reduction, production and administration time, and potential audience. The MCN has since migrated all processes to Microsoft Media. Windows Media supports a process called Multiple Bit Rate (MBR) video. Put simply, MBR video allows MCN to create a presentation geared toward either low (those users below 128k) or high (those users above 128k) bandwidth. The software determines the minimum speed required by the presentation to stream then negotiates between the client computer (the user) and the server the most bandwidth conserving connection. Using MBR video we are able to stream presentations at 28-32k which previously required 56k+ using Real media. MCN is currently in the process of converting all assets previously developed in Real media to the Microsoft Media format to better serve our users.

*Evaluate alternative connectivity models, including cable modem connections or access to cable networks as a means to enhance distribution of educational content.*

The MCN has evaluated multiple alternative connectivity models, including cable modems, ISDN, ADSL, and traditional T1 & T3 service lines. We have found that cable modems are an excellent method of distributing educational content. Cable modems provide a low cost, high bandwidth alternative for the user. This allows educational content to become more dynamic and interactive increasing the quality and effectiveness of the educational activity.

*Evaluate the Internet 2 as to its availability to sustain the necessary bandwidth for the Moffitt Cancer Network.*

Moffitt Information Technology is currently evaluating Internet 2. Development in this area will depend on the more general availability of the Internet 2 to MCN users.

*Resolve firewall and security issues to provide secure communication for clinical data as well as to adequately deal with subscriber/user requirements for security to permit desktop access.*

A firewall has been put in place to ensure secure communications for clinical data and to address user security issues. Moffitt IT, in coordination with the MCN is currently working to develop firewall policy relating to streaming media. In August 2000, MCN moved towards streaming media as UDP packets, as opposed to only TCP packets. By doing so, caching of media streams is nearly eliminated. This required an extensive review of firewall issues. We are now looking at new processes that will embellish firewall security. Only designated ports will be available to predetermined medical professionals. In addition, data will only be available at pre-selected times and with pre-selected permission or authorization levels.

*Uniform Resource Locator based on specific one-time virtual names.*

All prerecorded media will be encrypted in the near future and will have unique keys for specific use. Additional security methods are still being researched and firewall security is a priority.

*Expand the number of Authorized users to the Moffitt Cancer Network.*

Expansion of authorized users is critical to the digital convergence with MCN's on going research and development. We are now capable of delivering "On-demand", encrypted, and live media to desktops both user specific and publicly when appropriate. In addition, with the recent addition of continuing credit hours for nursing, we have opened a huge medical audience for MCN.

Authorized users increased by over 800% in the year 2000. We expect a similar increase in the coming year.

**Task 3. Implement a mechanism to deliver continuing education credits through on-line testing and automated submission/evaluation. (Months 1-60).**

*Arrange for automated notification of Department of Education staff for each new presentation selected for the Moffitt Cancer Network.*

Prior to inclusion in the MCN, the Moffitt Department of Education reviews each presentation for quality of educational content.

*Establish ongoing procedures to obtain releases, objectives and CME questions to implement to permit encoding of presentations and inclusion onto the Moffitt Cancer Network.*

Presenters sign a release to rebroadcast prior to the videotaping of their presentation. The Moffitt Department of education works closely with the presenter and the MCN to establish objectives, determine appropriate CME questions and evaluate the overall quality of the educational content of the respective presentation. Upon the completion of this work, all information is passed to the MCN for inclusion into the MCN website for delivery to the user.

*Create documentation and procedures to collect appropriate demographics on individuals desiring CME and implement electronic automated notification of our Continuing Education Office to authorize and verify CMEs earned.*

Appropriate demographic information is collected from all individuals wishing to receive CME credit for physicians or nurses contact hours. Upon completion of a CME credit or contact hours, the MCN staff is electronically notified. The results of the activity are graded electronically and the information is forwarded to the USF Education Department if a CME credit or contact hour was in fact earned.

In early 2001 MCN developed a process whereby all relevant information pertaining to the educational activity and credit received is transmitted via an encrypted data string directly into the USF Continuing Education certificate processing cue. This eliminates a number of steps while reducing the probability of error. MCN currently uses a redundant system whereby USF Continuing Education records are audited each month against MCN records to ensure proper certificate issuance.

*Automatically link the Cancer Library to the acquisition process so that they are aware of new acquisitions and receive opportunities to extract key words for indexing, sorting and searching.* Upon the completion of the digitization of a presentation, the digitized presentation is forwarded to the Cancer Center Librarian for review. The Cancer Center Librarian extracts key words used

for indexing, sorting and searching presentations on the MCN website. These keywords are added to the MCN website database for each respective presentation.

*Extend the CME process to include CEUs for nursing and pharmacy.*

The MCN currently offers CME credit for physicians as well as, more recently added, contact hours for nursing continuing professional education (CEU). The certifications are provided in cooperation with the USF College of Medicine and Nursing, respectively. We are continuing to explore the applicability of the content to other healthcare providers, such as pharmacists, and the requirements to offer continuing education credits.

*Expand the educational content offerings to include mandatory requirements for risk analysis, HIV, infection control, etc.*

The MCN has expanded the educational offerings to include a number of JCAHO requirements for nurses, physicians and staff. These offerings are available internally to all personnel via the Moffitt Cancer Center Intranet.

#### **Task 4. Design and create a web page to permit easy sorting, searching and selection of educational programming. (Months 1-24)**

*Organize educational content along primary audience lines and develop a key word searching algorithm to subset for presentations.*

An algorithm has been developed allowing keyword searching. The keywords are determined during the review of the presentation by the cancer center library. A new algorithm was developed this year allowing a more efficient search. The MCN website provides chronological ascending/descending, keyword search, search within results, and presenter last name, first name searches.

*Implement a database for key words according to a standard nomenclature, utilizing NLM MeSH headings, cancer site, etc.*

A keyword database has been created and is used by the MCN website for searching. The keywords are determined by the Cancer Center Librarian prior to the addition of a presentation to the MCN. The keywords are based on NLM MeSH standards.

*Expand implementation of Active Server Page (ASP) extensions to the multimedia hypertext (HTML) by adding onto the 'back-end' of the Web application i.) procedural language scripting and ii.) the ability to exchange information with a fully functioning database.*

ASP has been used throughout the site to produce dynamic, database driven web pages. ASP is used in all areas of the site to set procedural paths, increase security and generate dynamic content from the MCN databases.

*Expand and refine the JET database to incorporate user defined search phrases that are located within a variety of fields associated with the database, including a textual 'objectives' section, MeSH headings, cancer site, canned search categories, etc.*



The MCN has increased the capability of the Jet database to allow user defined search phrases. These phrases search for matches in the textual 'objectives' section, MeSh headings (keywords), cancer site, and canned search categories.

*Monitor utilization by remote site to evaluate the frequency and demand for various types of educational content to permit refinements and revisions to improve offerings.*

The MCN gathers extensive information in regards to use of the MCN website. This information includes website traffic, time spent, the number of presentations watched, for credit or not, and the frequency with which each presentation is watched.

**Task 5. Design and create a web page to deliver physician referral information that includes submission electronic case record consisting of text and imaging data. (Months 1-36)**

*Develop and implement a database to archive text and imaging data for retrieval by consulting Cancer Center physicians and integration with Moffitt Cancer Center clinical information systems.*

MCN plans on migrating its current database to a Microsoft Structured Query Language database before the end of the year. Since its media is stored as objects now, its future database will be based on usage of objects. As of July 2000, MCN began storing media and text, the former in two object formats based on Real and Microsoft Media.

*Develop a structured computerized clinical case description that provides a minimally relevant set of data that describes a clinical case for second opinion and consultation.*

Efforts to date have focused on image transfers and the capability to be DICOM compliant. Appropriate mechanisms have been developed along with interfaces to hospital PACS and Radiology Departments. Exploration is currently underway to exchange textual information and establish the computerized clinical case record.

*Acquire hardware and software to provide audio and video real time and time shifted streaming of case conferencing to remote locations for user viewing over secure communication links.*

In July 2000 MCN procured rack mounted dual processor servers and audio/video equipment for the purpose of providing both real-time streaming of media as well as simultaneous capture of that media for archive.

In December 2000 MCN began exploring the use of low-cost, low bandwidth one-way and two-way case-conferencing equipment. This is equipment would allow the patient to contact and conference with their respective physician without leaving their home. A preliminary trial of the equipment is currently underway.

*Establish the necessary gateways and bridges to provide connections at a range of bandwidths to support remote connectivity.*

See, also Task 2. All processes will be controlled remotely and is designed for live to archive times of no more than 5 minutes. In other words, five minutes after a live broadcast event is completed, an "On-Demand" rebroadcast will be available to specific users. The former being

broadcast via secure port and virtual link and the latter are encrypted for use with a specific key. Software development for all new processes is scheduled to begin in the first quarter of 2001.

As of February 2001, all necessary gateways and bridges have been put in place and 90% of critical functionality may be controlled remotely. Requirements are reviewed on a regular basis by Moffitt IT staff.

*Design and implement web-based front ends to Moffitt Cancer Center clinical systems to permit secure access to patient information of patient's referred or submitted to case conferencing or second opinions.*

MCN and Moffitt have collaborated to create a total package for streaming media distribution. Internally, Moffitt is hardware ready to multicast media events and with the establishment of a new dedicated media server in August 2000; it has implemented a load-balanced high bandwidth portal for streaming media for both the Intranet and Internet. In addition, using specified unicast stations; MCN can deliver media events to other facilities that can multicast and therefore reducing the bandwidth load on MCN's media server. A test of the Unicast/Multicast processes is currently being planned.

**Task 6. Provide access to case conferencing from remote locations using easily available audio/video to the desktop. (Months 1-48)**

*Complete telegenetics experiment to assess feasibility and acceptability of this format for the exchange of clinical information.*

Telemedicine began to accrue subjects on May 11, 2000. To date, 15 individuals have been asked to participate in the study, and 11 were enrolled. Based on these numbers the participation rate in the study is 73%.

Of those who refused to participate:

- none had any prior experience with video conferencing
- Three of the four had used computer several or many times and only had used a computer only once or twice.

Of those who participated:

- 9 were non-Hispanic white, one was African American and one was Hispanic.
- 3 out of eleven had had some kind of video conferencing before, which was related to their work.
- 3 out of eleven had been a part of some kind of research.
- 6 out of eleven were randomized to Telemedicine counseling, while 5 out of eleven had face to face counseling
- The overall satisfaction level was very satisfactory for six out of those who were in the Telemedicine counseling arm (6)

The overall satisfaction level was very satisfactory for four and satisfactory for one out of those who were in the Face to Face counseling arm (5)

*Implement additional sites to expand this program and resolve billing issues within the context of existing laws and regulations regarding telehealth and teleconsultation programs.*

MCN has begun building the administrative infrastructure to deal with access, billing and scheduling issues. This includes a point of contact to receive requests, coordination of schedules for presentations and an administrative web-based front end to view a calendar of presentations and establish the appropriate login and passwords for approved permissions. New legislation is expected during the current legislative session that will have a direct bearing on regulations governing telemedicine and telehomecare.

*Establish the necessary gateways and bridges to provide connections at a range of bandwidths to support remote connectivity.*

See, also Task 2. All processes will be controlled remotely and is designed for live to archive times of no more than 5 minutes. In other words, five minutes after a live broadcast event is completed, an "On-Demand" rebroadcast will be available to specific users. The former being broadcast via secure port and virtual link and the latter are encrypted for use with a specific key. Software development for all new processes is scheduled to begin in the first quarter of 2001.

*Develop tunneling or other secure links to resolve firewall issues regarding LAN configurations at both the Moffitt Cancer Center and remote sites.*

Moffitt is using Virtual Private Networks now.

*Acquire and install technology in conference centers where case conferencing generally occurs for selected clinics to permit retrieval and display of multiple images and clinical data submitted for this purpose by remote users.*

All hardware has been purchased for this project and a formal walkthrough and equipment installations has taken place. For each possible site, a detailed plan of operations has been developed to establish the capability to schedule and transmit signals for MCN distribution. MCN has purchased and will implement within the next few weeks streaming equipment for Pathology. This system will include audio capture and image capture from microscope slides and x-rays as well as the audience during discussions.

As of March 2001, MCN has successfully completed the installation of case conferencing equipment in one primary conference center and plans to complete an additional three by October.

*Assess utilization of this technology to refine and revise formats and improve the quality and ease of remote access.*

As noted previously, MCN has made it a priority to improve the quality of its products. Moving towards the use of Microsoft products and its MPEG-4 streaming format will reduce labor and increase quality across the board. MCN will be writing new programs for remote control of streaming servers and changing its current database into an SQL based database, which will improve speed and increase capacity. Finally, changes in its business practices will reduce labor and increase its quality and functionality as well as increase its customer base.

In late 2000 and during the first half of 2001, MCN has worked to increase quality while significantly lowering bandwidth requirements for the user, while at the same reducing the production time required by half of what was required the previous year.

## **KEY RESEARCH ACCOMPLISHMENTS:**

- The Moffitt Cancer Network is available to users and can be found at <http://network.moffitt.usf.edu>
- The MCN currently has 212 presentations in its library, increasing at a rate of 4.8 presentations per month on average. Additionally, 12 conferences sponsored by USF and Moffitt are also currently available online.
- All approved Grand Rounds presentations have been taped by the Moffitt Multimedia Education Resources Center (MERC) for over one year preceding this report. The video is captured on digital DVCAM 94 minute tapes.
- Since many of the presenters use only 35mm slide for their presentations, a process of creating final production audio/video Real media for streaming via TCP/IP has been developed. This process requires post-production labor and requires the best of the video's individual frames to be captured a second time to recreate higher quality computer images. MCN has made significant progress in this area and as of June 2000 has begun using presenter's PowerPoint files when ever possible to bypass the second image rendering process. This has reduced labor time from 3.5 days to about 5 hours, while increasing image quality noticeably. This labor savings is not realized when presenters are using 35mm film only.
- In addition to pre-presentation file acquisition, MCN has begun the development of a presenter packet. When finished, this packet will inform presenters to repeat important questions asked at the end of events like Grand Rounds and these will be added to the content to be available to medical professionals at the MCN website.
- National oncology conferences have been taped and included in the MCN website database.
- Conferences have been subdivided into their respective presentations and are categorized searchable as well as searchable using the website database Access Jet engine. All conferences are pre-qualified for their ability to become online educational materials by the University of South Florida College of Medicine and, more recently, the University of South Florida College of Nursing.
- MCN is now beginning to test and research a second media streaming process using MPEG-4. Not standardized by the World Wide Web Consortium yet, the newly introduced streaming format allows for embedded script and control processes within the media stream.

## **REPORTABLE OUTCOMES:**

- patents and licenses applied for and/or issued;  
A notice of disclosure has been filed with the USF office of patents in anticipation of the completion of a patent application.

## **CONCLUSIONS:**

The purpose of this research is to create processes that allow medical professional to extend their abilities through the use of electronic media. MCN has evolved in pace with the change of that technology and because of its foresight and its dedication to purpose it has kept ahead of the technology. MCN has realized that streaming media processes are not yet capable of high

definition presentations at low bandwidth and has developed the best possible processes for producing usable educational media delivery using network technology. MCN's research into these processes has revealed the need for specific products and their uses. Several new programs will be developed to address these. For example, to cut down on the need for many new employees, MCN will be developing a broadcast program that will allow a single user to set start/stop times on a given event at a given location. In addition, this program must have a simple user interface that a cameraman will be familiar with, similar to a tape recorder. Further investigation into security processes must be addressed when MCN implements streaming from doctor to doctor in case reviews including new HIPAA requirements for medical privacy and confidentiality. Providing second opinion and expert information to referring physicians is an extremely important addition to MCN's research. While continuing education is a given, in the final analysis, it may be in the medical professional interaction that MCN becomes most useful.

REFERENCES: None

APPENDICES:

Attached



H. Lee Moffitt Cancer Center & Research Institute  
*At the University of South Florida - Tampa, FL*  
A National Cancer Institute Designated Cancer Center

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Scientific Presentations

## Moffitt Cancer Network

User History

Click on the Video Classroom for scientific presentations on cancer treatment, biology, screening and prevention research. These full-length videos are searchable by topic as individual presentations or as part of a scientific conference. Continuing education credit for physicians (CME) or contact hours for nursing education are available online at a nominal cost.

Click on Reference for an online review of alternative and complementary medicines, their intended use (i.e., claims for cancer prevention or treatment), applicable research studies, safety/toxicity and recommendations.

Click on LiveAccess for real-time scheduled scientific presentations brought to you by the H. Lee Moffitt Cancer Center and Research Institute. Special live presentations or access to case conferencing can be prearranged by contacting MCN support.

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[Alternative Medicine](#)

## Scientific Presentations - *Sorted by Most Recent*

Date: 3/9/01

Selective Stem Cell Survival in Preclinical Settings Using Targeted DNA Repair

**Speaker:** Stanton L. Gerson M.D.

Approved for 1 hour of CME Credit

Sort Order:

Most Recent



Date: 3/8/01

The Moffitt Community Clinical Oncology Program  
Research Base: An opportunity for cancer prevention and control researchers

**Speaker:** Jeffrey P. Krischer Ph.D.

Search For:



Date: 2/16/01

RECIST: New Criteria for Determining Response in Solid Tumors

**Speaker:** Bruce J. Giantonio M.D.  
University of Pennsylvania

Approved for 1 hour of CME Credit

Approved for 1 contact hour for nurses

[Information About Continuing Education Credits For Physicians \(C](#)

[Information About Continuing Education Contact Hours For Nurses \(CEU\)](#)

Date: 2/9/01

Malignant Glioma: Molecular Mechanisms and Translational Developments

**Speaker:** John Laterra M.D., Ph.D.  
Johns Hopkins University School of Medicine

Approved for 1 hour of CME Credit

Approved for 1 contact hour for nurses

Date: 2/2/01

Biochemical Pathways of Apoptosis

**Speaker:** Xiaodong Wang Ph.D.  
University of Texas Southwestern Medical Center

Approved for 1 hour of CME Credit

Approved for 1 contact hour for nurses

Date: 1/5/01

Ovarian Cancer Models

**Speaker:** Thomas Hamilton Ph.D.  
Fox Chase Cancer Center





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## The Role of STAT Proteins in Growth Control



**Presenter:** Jacqueline Bromberg, M.D., Ph.D.

Assistant Professor

Memorial Sloan Kettering Cancer Center and the Rockefeller University  
New York, NY

**Date:** June 16, 2000

**Video Length:** 55 minutes

**Objectives:** After viewing this presentation, you will be able to:

- Discuss the importance of phosphorylation cascades in transcriptional regulation.
- Examine the critical role STAT proteins may play in the development of cancer.

You may watch this presentation and get CME credit or 1 contact hour (when applicable) for a nominal fee of \$25.00

**Target Audience:**

This program is intended for physicians and nurses who are primarily involved in cancer care, research and education and is intended to advance clinical and research reasoning to contribute to the mission and prevention and cure of cancer.

This presentation requires RealPlayer.

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## Conferences

*Click on a conference title below to choose from the available presentation(s) on that conference*

**Novel Therapeutic Approaches in  
the Treatment of Multiple**

**Myeloma**

March 2001

**New Molecular Targets for  
Cancer Therapy**

October 2000

**End of Life - Issues in the 21st  
Century**

April 2000

**Florida Pituitary Symposium -  
Y2K Update - Focusing on  
Comprehensive Care of the  
Pituitary Patient**

April 2000

**Current Advances in Cancer Care**  
February 2000

**Advances in Pediatric  
Hematology/Oncology**

January 2000

**Evidence-Based Practice of  
Oncology**

November 1999

**Cancer Communications - Talk,  
Tools & Technology**

September 1999

**Innovations in Breast Cancer  
Therapy**

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### Alternative Medicine

Alternative and Complementary/Integrative Nutritional Therapies in Cancer Prevention and Treatment" by Nagi Kumar, Ph.D, R.D. This is an online review of alternative and complementary medicines, their intended use (i.e., claims for cancer prevention or treatment), applicable research studies, safety/toxicity and recommendations.

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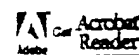
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## Alternative and Complementary/Integrative Nutritional Therapies in Cancer Prevention and Treatment

*by Nagi Kumar, Ph.D, R.D.*

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